"Aviation Concern "EKIP"

The basic design feature of flying vehicles "EKIP" is the new vortex control system (UPS) of the airflow in the boundary layer mounted on the stern surface of the aircraft. This system ensures steady airflow around the body of the vehicles and decreases its drag by creating a set of aggregate of consecutive cross vortex. The vortex boundary layer airflow control system is patented in Russia and abroad in Europe, USA and Canada. It allows at low level of power consumption (6-8 % of the thrust of power engines) to ensure steady airflow around the vehicle body during the cruising flight and during takeoff and landing at angle of attack up to 40°.

The flying vehicles "EKIP" will transport heavy loads and large numbers of passengers (1000 and more) to the existing airfields of continental and waterlocked countries.

It should be specially noted that the flying vehicles "EKIP" may use gas fuel (natural gas and hydrogen). Large volumes of the flying vehicle permit to locate inside it without changing the external contour large volume gas fuel tanks. Limited resources of oil (to last for 50 years) require transition of airplanes to gas fuel. However limited areas of thin wings of existing airplanes do not allow this transition. As the gas fuel occupies half of passenger compartment on airplane Tu-156 and in airplane A-310 (DASA project) the fuel occupies the whole area above the passenger compartment thus changing the external contour of the airplane and decreasing its lift-drag performances. The flying vehicles "EKIP" permit due to large volumes to locate the fuel tanks in the lateral part of the aircraft without changing the external contour of the vehicle.

It should be noted that with the use of hydrogen fuel the flying vehicles "EKIP" may increase the range of flight 2-3 times compared to existing airplanes of the same load-carrying capacity. Operation of flying vehicles "EKIP" using natural gas and hydrogen will permit to decrease contaminating emissions of exhaust products, i.e. the flying vehicles "EKIP" will be more environmentally safe than the existing airplanes.

It should be specially noted that use on the flying vehicles "EKIP" of liquid methane will allow to reduce the fuel expenses more than 5-8 times, which should result in a decrease of operating expenses 1.5-2 times compared with the existing airplanes.

We should pay special attention to the design of the body of flying vehicles "EKIP". The relative weight of the structure of the vehicles body (compared to takeoff weight) is 30 % lower than the weight of existing airplanes due to the use of composite materials according to the estimation of the DASA special ists. This difference in the weight of the structure re-suits in the increase of commercial load by 30 % at fixed range of flight. The possibility to use composite materials in the body of flying vehicles "EKIP" is related to the absence of concentrated loads on the body as a result of absence of large wings and traditional wheel landing gear. Under all flight conditions, including takeoff and landing, the body of the aircraft is under uniformly distributed load, the static component whereof does not exceed the load of a layer of water 300 mm thick. The tail unit of flying vehicles "EKIP" is used for location of aerodynamic control surfaces. The power unit of flying vehicles "EKIP" is located inside the body, in the stern part. It consists of two or more thrust high economy by-pass turbojet engines and two or more auxiliary high-economy dual generator turboshaft engines. The power units provide for motion of the vehicle, whereas auxiliary engines provide for operation of air cushion landing gear and boundary layer control device ensuring steady airflow around the body of flying vehicles"EKIP" and decrease of drag. During takeoff and landing the auxiliary power units operate in the maximum power mode, whereas during the cruising flight they operate in maximum economy mode.

The location of thrust bypass engines inside the body of the aircraft permit to create afterburners for the by-pass